

AMENDMENTS TO THE CLAIMS

1. (currently amended) A curable composition, comprising:

a functionalized poly(arylene ether);

an olefinically unsaturated monomer;

about 0.2 to about 5 part by weight of a curing initiator per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer; and

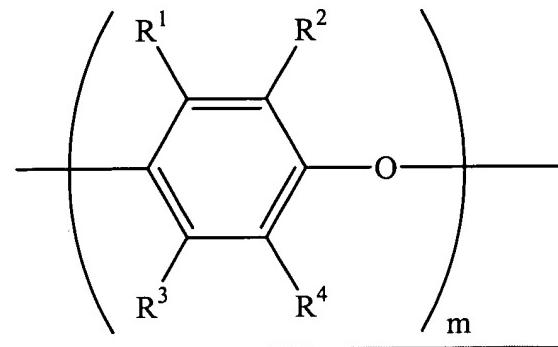
about 0.005 to about 1 part by weight of a curing inhibitor per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer;

wherein the weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1; and

wherein the functionalized poly(arylene ether) resin is a capped poly(arylene ether) resin having the formula

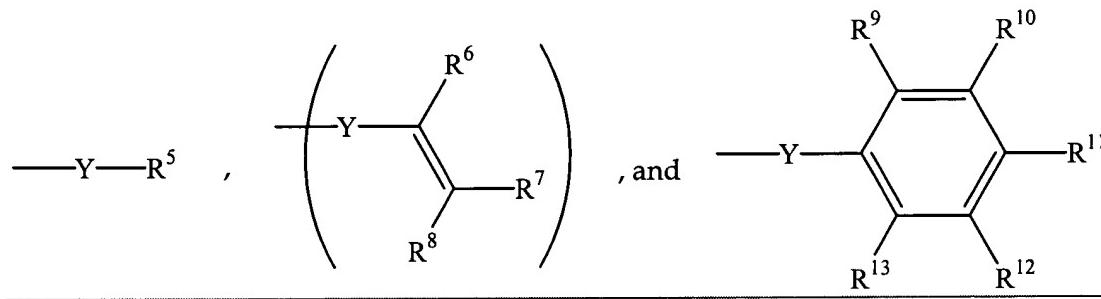
$Q(J-K)_y$

wherein Q is the residuum of a monohydric, dihydric, or polyhydric phenol; y is 1 to 100; J has the formula

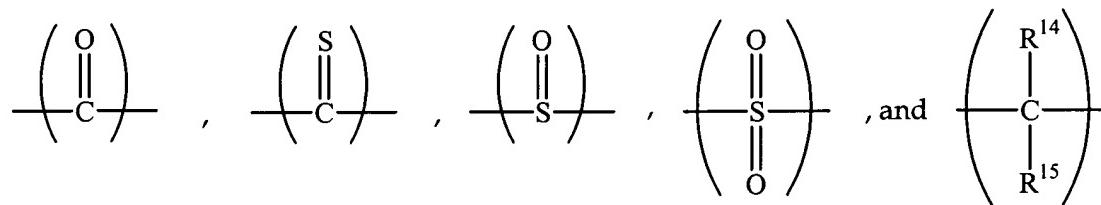


wherein R¹ and R³ are each independently selected from the group consisting of hydrogen, halogen, primary or secondary C₁-C₁₂ alkyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, C₁-C₁₂ aminoalkyl, C₁-C₁₂

hydroxyalkyl, phenyl, C₁-C₁₂ haloalkyl, C₁-C₁₂ hydrocarbyloxy, and C₂-C₁₂ halohydrocarbyloxy wherein at least two carbon atoms separate the halogen and oxygen atoms; R² and R⁴ are each independently selected from the group consisting of halogen, primary or secondary C₁-C₁₂ alkyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, C₁-C₁₂ aminoalkyl, C₁-C₁₂ hydroxyalkyl, phenyl, C₁-C₁₂ haloalkyl, C₁-C₁₂ hydrocarbyloxy, and C₂-C₁₂ halohydrocarbyloxy wherein at least two carbon atoms separate the halogen and oxygen atoms; m is 1 to about 200; and K is a capping group selected from the group consisting of



wherein R⁵ is C₁-C₁₂ hydrocarbyl optionally substituted with one or two carboxylic acid groups, R⁶-R⁸ are each independently hydrogen, C₁-C₁₈ hydrocarbyl optionally substituted with one or two carboxylic acid groups, C₂-C₁₈ hydrocarbyloxycarbonyl, nitrile, formyl, carboxylic acid, imidate, and thiocarboxylic acid; R⁹-R¹³ are each independently selected from the group consisting of hydrogen, halogen, C₁-C₁₂ alkyl, hydroxy, carboxylic acid, and amino; and wherein Y is a divalent group selected from the group consisting of



wherein R¹⁴ and R¹⁵ are each independently selected from the group consisting of hydrogen and C₁-C₁₂ alkyl.

2. (original) The curable composition of claim 1, comprising at least about 1 part by weight of the curing initiator.

3. (original) The curable composition of claim 1, comprising at least 100 micromoles of curing initiator per gram of resin, wherein resin consists of the functionalized poly(arylene ether) and the olefinically unsaturated monomer.

4. (original) The curable composition of claim 1, comprising at least about 0.05 part by weight of the curing inhibitor.

5. (original) The curable composition of claim 1, comprising at least 50 micromoles of curing inhibitor per gram of resin, wherein resin consists of the functionalized poly(arylene ether) and the olefinically unsaturated monomer.

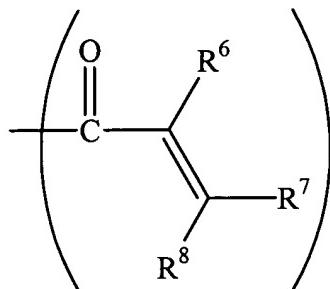
6. (original) The curable composition of claim 1, wherein the weight ratio of the curing initiator to the curing inhibitor is about 2:1 to about 20:1.

7. (original) The curable composition of claim 1, wherein the molar ratio of the curing initiator to the curing inhibitor is about 20:1 to about 1:1.

8. (canceled)

9. (currently amended) The curable composition of claim 51, wherein Q is the residuum of a monohydric phenol. |

10. (original) The curable composition of claim 1, wherein the functionalized poly(arylene ether) is a capped poly(arylene ether) comprising at least one capping group having the structure



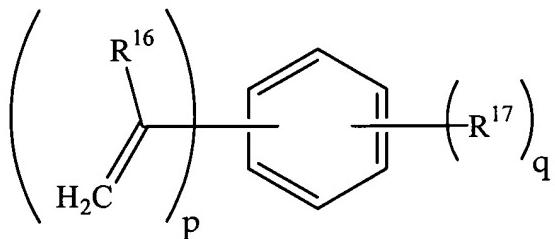
wherein each occurrence of R^6-R^8 is independently hydrogen, C₁-C₁₈ hydrocarbyl optionally substituted with one or two carboxylic acid groups, C₂-C₁₂ hydrocarbyloxycarbonyl, nitrile, formyl, carboxylic acid, imide, and thiocarboxylic acid.

11. (original) The curable composition of claim 1, wherein the functionalized poly(arylene ether) has a number average molecular weight of about 1,000 to about 20,000 atomic mass units.

12. (original) The curable composition of claim 1, comprising about 5 to about 90 parts by weight of the functionalized poly(arylene ether) per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer.

13. (original) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an alkenyl aromatic monomer, an allylic monomer, an acryloyl monomer, or a mixture thereof.

14. (Withdrawn) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an alkenyl aromatic monomer having the formula



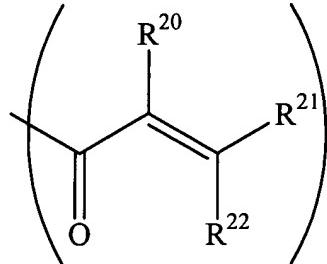
wherein each occurrence of R^{16} is independently hydrogen or C₁-C₁₈ hydrocarbyl; each occurrence of R^{17} is independently halogen, C₁-C₁₂ alkyl, C₁-C₁₂ alkoxy, or C₆-C₁₈ aryl; p is 1 to 4; and q is 0 to 5.

15. (Withdrawn) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an alkenyl aromatic monomer selected from styrene, α -methylstyrene, 2-methylstyrene, 3-methylstyrene, 4-methylstyrene, 2-t-butylstyrene, 3-t-butylstyrene, 4-t-butylstyrene, 1,3-divinylbenzene, 1,4-divinylbenzene, 1,3-diisopropenylbenzene, 1,4-diisopropenylbenzene, styrenes having from 1 to 5 halogen substituents on the aromatic ring, and combinations thereof.

16. (Withdrawn) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises styrene.

17. (Withdrawn) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an allylic monomer selected from diallyl phthalate, diallyl isophthalate, triallyl mellitate, triallyl mesate, triallyl benzenes, triallyl cyanurate, triallyl isocyanurate, mixtures thereof, and partial polymerization products prepared therefrom.

18. (original) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an acryloyl monomer comprising least one acryloyl moiety having the structure



wherein R²⁰-R²² are each independently selected from hydrogen, C₁-C₁₂ hydrocarbyl, C₂-C₁₈ hydrocarbyloxycarbonyl, nitrile, formyl, carboxylic acid, imide, and thiocarboxylic acid.

19. (original) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an acryloyl monomer comprising at least two acryloyl moieties.

20. (original) The curable composition of claim 1, wherein the olefinically unsaturated monomer comprises an acryloyl monomer selected from trimethylolpropane tri(meth)acrylate, 1,6-hexanediol di(meth)acrylate, neopentyl glycol di(meth)acrylate, ethylene glycol di(meth)acrylate, propylene glycol di(meth)acrylate, cyclohexanedimethanol di(meth)acrylate, butanediol di(meth)acrylate, diethylene glycol di(meth)acrylate, triethylene glycol di(meth)acrylate, isobornyl (meth)acrylate, methyl (meth)acrylate, methacryloxypropyl trimethoxysilane, ethoxylated (2) bisphenol A di(meth)acrylate, and mixtures thereof.

21. (original) The curable composition of claim 1, comprising about 10 to about 95 parts by weight of the olefinically unsaturated monomer per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer.

22. (original) The curable composition of claim 1, wherein the curing initiator is selected from benzoyl peroxide, dicumyl peroxide, methyl ethyl ketone peroxide, lauryl peroxide, cyclohexanone peroxide, t-butyl hydroperoxide, t-butyl benzene hydroperoxide, t-butyl peroctoate, 2,5-dimethylhexane-2,5-dihydroperoxide, 2,5-dimethyl-2,5-di(t-butylperoxy)-hex-3-yne, di-t-butylperoxide, t-butylcumyl peroxide, α,α' -bis(t-butylperoxy-m-isopropyl)benzene, 2,5-dimethyl-2,5-di(t-butylperoxy)hexane, di(t-butylperoxy) isophthalate, t-butylperoxy benzoate, 2,2-bis(t-butylperoxy)butane, 2,2-bis(t-butylperoxy)octane, 2,5-dimethyl-2,5-di(benzoylperoxy)hexane, di(trimethylsilyl)peroxide, trimethylsilylphenyltriphenylsilyl peroxide, 2,3-dimethyl-2,3-diphenylbutane, 2,3-trimethylsilyloxy-2,3-diphenylbutane, and mixtures thereof.

23. (original) The curable composition of claim 1, wherein the curing initiator comprises dicumyl peroxide, t-butyl peroxybenzoate, or a mixture thereof.

24. (original) The curable composition of claim 1, wherein the curing inhibitor is selected from diazoaminobenzene, phenylacetylene, sym-trinitrobenzene, p-benzoquinone, acetaldehyde, aniline condensates, N,N'-dibutyl-o-phenylenediamine, N-butyl-p-aminophenol, p-methoxyphenol, 2,4,6-triphenylphenoxy, pyrogallol, catechol, hydroquinone, monoalkylhydroquinones, t-butylhydroquinone, C₁-C₆-alkyl-substituted catechols, 4-t-butylcatechol, dialkylhydroquinone, 2,4,6-dichloronitrophenol, halogen-ortho-nitrophenols, alkoxyhydroquinones, mono- and di- and polysulfides of phenols and catechols, thiols, oximes and hydrazones of quinone, phenothiazine, dialkylhydroxylamines, and mixtures thereof.

25. (original) The curable composition of claim 1, wherein the curing inhibitor comprises hydroquinone, p-methoxyphenol, t-butylhydroquinone, 4-t-butylcatechol, or a mixture thereof.

26. (Withdrawn) The curable composition of claim 1, wherein the curing inhibitor comprises an uncapped poly(arylene ether).

27. (original) The curable composition of claim 1, further comprising about 5 to about 95 weight percent of a particulate filler, based on the total weight of the composition.

28. (original) The curable composition of claim 27, wherein the particulate filler comprises fused silica.

29. (original) The curable composition of claim 1, having a spiral flow of at least about 70 centimeters measured at a temperature in the range of about 140 to about 180°C and a pressure in the range of about 3 to about 7 megapascals.

30. (original) The curable composition of claim 1, having a Shore D hardness measured at curing temperature of at least 70 after curing for 120 seconds at a curing temperature in the range of about 140 to about 180°C.

31. (original) The curable composition of claim 1, exhibiting a d(log ion viscosity)/d(time) value of 1 ohm-centimeter/minute, measured by dielectric cure monitoring, after curing at 160°C for a time in the range of about 50 to about 110 seconds.

32. (original) A curable composition, comprising:

a functionalized poly(arylene ether) comprising a (meth)acrylate-capped poly(2,6-dimethyl-1,4-phenylene ether) resin, a (meth)acrylate-capped poly(2,6-dimethyl-1,4-phenylene ether-*co*-2,3,6-trimethyl-1,4-phenylene ether) resin, or a mixture thereof;

an acryloyl monomer comprising at least two acryloyl moieties;

a particulate filler;

about 0.2 to about 5 parts by weight of a curing initiator per 100 parts by weight total of the functionalized poly(arylene ether) and the acryloyl monomer; wherein the curing initiator is selected from benzoyl peroxide, dicumyl peroxide, methyl ethyl ketone peroxide, lauryl peroxide, cyclohexanone peroxide, t-butyl hydroperoxide, t-butyl benzene hydroperoxide, t-butyl peroctoate, 2,5-dimethylhexane-2,5-dihydroperoxide, 2,5-dimethyl-2,5-di(t-butylperoxy)-hex-3-yne, di-t-butylperoxide, t-butylcumyl peroxide, α,α' -bis(t-butylperoxy-m-isopropyl)benzene, 2,5-dimethyl-2,5-di(t-butylperoxy)hexane, di(t-butylperoxy) isophthalate, t-butylperoxy benzoate, 2,2-bis(t-butylperoxy)butane, 2,2-bis(t-butylperoxy)octane, 2,5-dimethyl-2,5-di(benzoylperoxy)hexane, di(trimethylsilyl)peroxide, trimethylsilylphenyltriphenylsilyl peroxide, and mixtures thereof; and

about 0.005 to about 1 part by weight of a curing inhibitor per 100 parts by weight total of the functionalized poly(arylene ether) and the acryloyl monomer; wherein the curing inhibitor is selected from diazoaminobenzene, phenylacetylene, sym-trinitrobenzene, p-benzoquinone, acetaldehyde, aniline condensates, N,N'-dibutyl-o-phenylenediamine, N-butyl-p-aminophenol, 2,4,6-triphenylphenoxy, pyrogallol, catechol, hydroquinone, monoalkylhydroquinones, p-methoxyphenol, t-butylhydroquinone, C₁-C₆-alkyl-substituted catechols, 4-t-butylcatechol, dialkylhydroquinone, 2,4,6-dichloronitrophenol, halogen-ortho-nitrophenols, alkoxyhydroquinones, mono- and di- and polysulfides of phenols and catechols, thiols, oximes and hydrazones of quinone, phenothiazine, dialkylhydroxylamines, and mixtures thereof;

wherein the weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1.

33. (original) A curable composition, comprising:

about 5 to about 90 parts by weight of a methacrylate-capped poly(2,6-dimethyl-1,4-phenylene ether);

about 10 to about 95 parts by weight of an ethoxylated bisphenol A dimethacrylate;

about 200 to about 2000 parts by weight of fused silica;

about 0.2 to about 5 parts by weight of dicumyl peroxide; and

about 0.005 to about 1 part by weight of 4-t-butylcatechol;

wherein all parts by weight are based on 100 parts by weight total of the methacrylate-capped poly(2,6-dimethyl-1,4-phenylene ether) and the ethoxylated bisphenol A dimethacrylate; and

wherein the weight ratio of the curing initiator to the curing inhibitor is about 2:1 to about 20:1.

34. (original) A cured composition, comprising the reaction products obtained by curing the curable composition of claim 1.

35. (original) A cured composition, comprising the reaction products obtained by curing the curable composition of claim 32.

36. (original) A cured composition, comprising the reaction products obtained by curing the curable composition of claim 33.

37. (original) An article comprising the cured composition of claim 34.

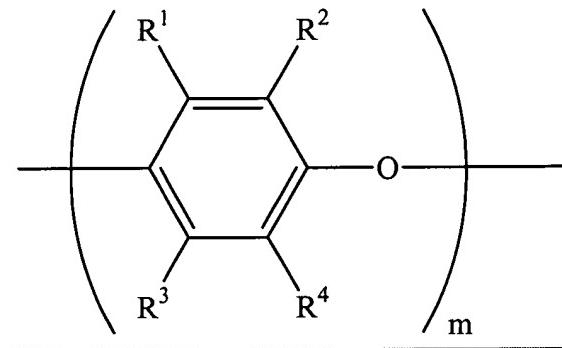
38. (original) An article comprising the cured composition of claim 35.

39. (original) An article comprising the cured composition of claim 36.

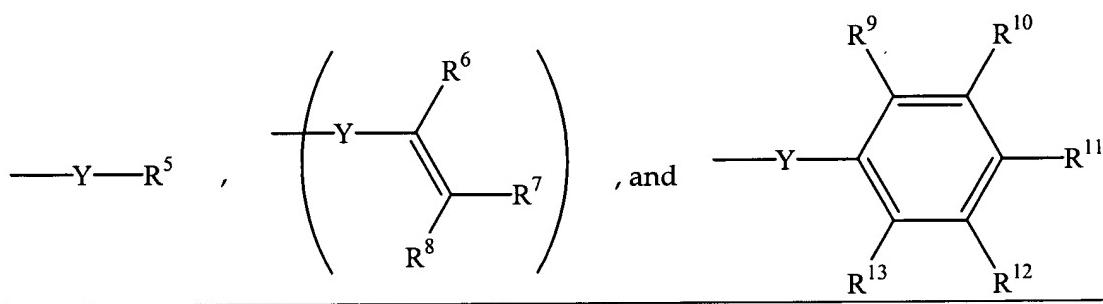
40. (currently amended) A method of forming a curable composition, comprising:
blending

a functionalized poly(arylene ether); wherein the functionalized poly(arylene ether)
resin is a capped poly(arylene ether) resin having the formula $\text{Q}(\text{J}-\text{K})_y$

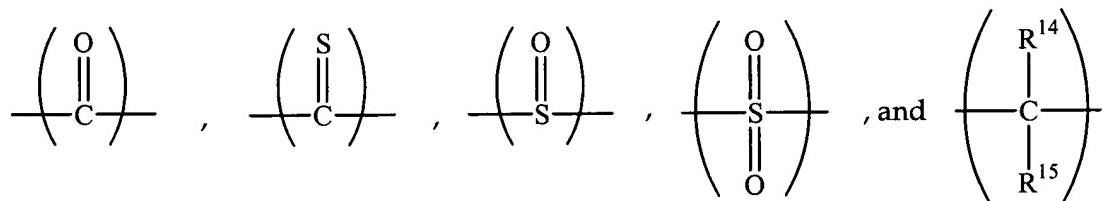
wherein Q is the residuum of a monohydric, dihydric, or polyhydric phenol; y is 1 to 100; J has the
formula



wherein R¹ and R³ are each independently selected from the group consisting of hydrogen, halogen,
primary or secondary C₁-C₁₂ alkyl, C₂-C₁₂ alkenyl, C₂-C₁₂ alkynyl, C₁-C₁₂ aminoalkyl, C₁-C₁₂
hydroxalkyl, phenyl, C₁-C₁₂ haloalkyl, C₁-C₁₂ hydrocarbyloxy, and C₂-C₁₂ halohydrocarbyloxy
wherein at least two carbon atoms separate the halogen and oxygen atoms; R² and R⁴ are each
independently selected from the group consisting of halogen, primary or secondary C₁-C₁₂ alkyl, C₂-
C₁₂ alkenyl, C₂-C₁₂ alkynyl, C₁-C₁₂ aminoalkyl, C₁-C₁₂ hydroxalkyl, phenyl, C₁-C₁₂ haloalkyl, C₁-
C₁₂ hydrocarbyloxy, and C₂-C₁₂ halohydrocarbyloxy wherein at least two carbon atoms separate the
halogen and oxygen atoms; m is 1 to about 200; and K is a capping group selected from the group
consisting of



wherein R^5 is C_1 - C_{12} hydrocarbyl optionally substituted with one or two carboxylic acid groups, R^6 - R^8 are each independently hydrogen, C_1 - C_{18} hydrocarbyl optionally substituted with one or two carboxylic acid groups, C_2 - C_{18} hydrocarbyloxycarbonyl, nitrile, formyl, carboxylic acid, imide, and thiocarboxylic acid; R^9 - R^{13} are each independently selected from the group consisting of hydrogen, halogen, C_1 - C_{12} alkyl, hydroxy, carboxylic acid, and amino; and wherein Y is a divalent group selected from the group consisting of



wherein R^{14} and R^{15} are each independently selected from the group consisting of hydrogen and C_1 - C_{12} alkyl;

an olefinically unsaturated monomer;

about 0.2 to about 5 parts by weight of a curing initiator per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer; and

about 0.005 to about 1 part by weight of a curing inhibitor per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer;

to form an intimate blend; wherein the weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1.